

REMARKS

Claims 1-21 and 23-36 are pending in this application. Claims 4-21 have been withdrawn. Claims 22-24 have been cancelled. Claims 1-3, 25-29, and 31-35 have been amended. Claims 37-41 are new. The amendments and new claims add no new matter.

Rejection of Claim 3 under 25 USC §103 as Obvious in view of Demirbas and Cregan

Claim 3 stands rejected as being unpatentable over Demirbas et al. (Crop Sci. 41: 1220-27, 2001) (hereinafter “Demirbas”) and Cregan et al. (Crop Sci. 39:1464-90, 1999) (hereinafter “Cregan”).

Claim 3 depends from amended claim 1, and recites the following:

A method for determining the presence of trait locus Rps8 in a soybean wherein the presence of trait locus Rps8 confers resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6, 7 and combinations thereof, comprising:

analyzing genomic DNA from the soybean for the presence of a combination of molecular markers on major linkage group F which are associated with said trait locus Rps8, whereby detecting the presence of the molecular markers provides an indication that said trait locus Rps8 is present in the soybean, and

wherein the molecular markers are markers Satt516 and Satt114 and wherein the method further comprises a step of determining that the soybean does not contain trait locus Rps3..

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (MPEP 2143.03, citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” (*Id.*, citing *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. (*Id.*, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

First, claim 3 depends from claim 1. Since claim 1 is nonobvious, claim 3 must also be nonobvious. (see MPEP cited above).

Second, neither Demirbas nor Cregan teach the Rps8 trait. Specifically, the recitation in the claim “wherein trait locus Rps8 is associated with soybean resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6, 7 and combinations thereof” is not present in the disclosures of Demirbas or Cregan. Demirbas teaches markers associated with Rps 1-6, but not Rps8. Accordingly, none of the plants analyzed in Demirbas would show resistance to all *P. sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7. (e.g., a plant possessing Rps3 would be susceptible to certain combination of *P. sojae* pathotypes, such as the combinations found in *P. sojae* race 17 (vir. 1b, 1d, 3a, 3b, 3c, 4, 5, 6, 7) and race 30 (vir 1a, 1b, 1k, 2, 3a, 4, 5, 6, 7). (See Declaration of Brian Diers, 3/13/07, hereinafter “Diers Dec.” at ¶8). Cregan merely discloses markers on different soybean linkage groups but does not teach the Rps 8 resistance trait or its location. Lacking any teaching or suggestion of the Rps8 trait locus or the specific markers for this locus, neither Demirbas nor Cregan can render claim 3 obvious.

This missing element, i.e. “trait locus Rps8,” is the new *P. sojae* resistance trait discovered by Applicants and referred to in Applicants’ response dated March 3, 2006. Applicants reiterate all their arguments in the March 3, 2006 response,¹ which together with the arguments presented above, make clear that claim 3 is nonobvious over Demirbas and Cregan.

¹ Applicants wish to correct a typographical error in the March 3, 2006 response. On page 21, last ¶, applicants quoted the Demirbas paper as stating: “Neither Satt114 nor Satt374 displayed any significant linkage to Rps3.” (this quote appeared in Demirbas page 1225, 1st Col., 1st ¶, last sentence). The quote in the paper, however, referred to Satt144, not Satt114. Applicants thank the Examiner for pointing out this error.

The sentence that Applicants meant to quote in the above mentioned paragraph, and which was referenced as Demirbas Discussion, page 1226, 1st col., 2nd ¶, lines 2-7, is: “Linkages were found for all but *Rps5*, but only the linkages (all $P < 0.05$) of Satt584, Satt530, Satt152, and Satt159 with the *Rps1* locus, and the linkage ($P < 0.09$) of Satt472 with the *Rps4* locus, were close enough to be possibly useful in MAS applications.” This supports

New Claim Rejections Under 35 USC §103 in view of Hegstad and Cregan

Claims 1-3 and 25-36 were rejected as unpatentable over Hegstad et al. (Crop Sci. 38:50-55, 1998) (hereinafter "Hegstad") in view of Cregan. Applicants submit that the Office has failed to make a *prima facie* case of obviousness because the cited prior art does not teach all the elements of the claims.

Claim 1 recites:

A method for determining the presence of trait locus Rps8 in a soybean wherein the presence of trait locus Rps8 confers resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6, 7 and combinations thereof, comprising:

analyzing genomic DNA from the soybean for the presence of a combination of molecular markers on major linkage group F which are associated with said trait locus Rps8, whereby detecting the presence of the molecular markers provides an indication that said trait locus Rps8 is present in the soybean.

Hegstad does not teach trait locus Rps8 associated with soybean resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6, 7 and combinations thereof. The Examiner stated as much in the Office Action of November 11, 2006 (page 7, 3rd ¶): "Hegstad et al do not teach the presence of trait locus Rps8 in a soybean wherein trait locus Rps8 . . . is associated with soybean resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7.") Similarly, Cregan does not teach the presence of trait locus Rps8 in a soybean wherein trait locus Rps8 is associated with soybean resistance to *Phytophthora sojae* pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6, 7 and combinations thereof.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (MPEP 2143.03, citing *In re Royka*, 490 F.2d 981,

Applicants argument that Demirbas ultimately negated the usefulness of Satt114 for marker assisted selection of Rps loci.

180 USPQ 580 (CCPA 1974)). The Examiner has argued that although the references do not *teach* trait locus Rps8, the references *suggest* such a trait because Hegstad states that “it is possible that additional *Rps* alleles are present which could not be detected with the current set of *Rps* probes” so that some soybean lines were assigned *Rps*? allele (Hegstad, page 54, 2nd col., 5th ¶). In addition, Hegstad states that “the resistance exhibited may be due to an unknown allele . . . or a unique *Rps* gene” suggesting either the “presence of a multigene interaction” or “a novel *Rps* allele.” (page 54, 2nd col., 6th ¶ to page 55, 1st col., end of 1st ¶).

Notwithstanding Hegstad’s statements, all of the accessions tested by Hegstad, including those designated *Rps*?, were susceptible to *P. sojae* race 7 (see Hegstad, Table 1). *P. sojae* race 7 has pathotypes vir 1a, 2, 3a, 4, 5, 6 and 7. (See Hornby (Ed.), Biological control of soil-borne plant pathogens, Chapter 21, p. 315, Table 21.2). Therefore, all of the soybean accessions tested in Hegstad were susceptible to *P. sojae* pathotypes vir 1a, 2, 3a, 4, 5, 6 and 7. In sharp contrast, Claim 1 recites the presence of trait locus Rps8 in a soybean that is associated with resistance to *P. sojae* pathotypes vir 1a, 2, 3a, 4, 5, 6 and 7. Quite plainly, none of the accessions in Hegstad, including those suggested to have a novel *Rps* allele, had trait locus Rps8. And whatever *Rps*? Allele may be suggested by Hagsted, there certainly is no teaching or suggestion of any such allele having a resistance pattern that is other than what is actually described in Hagsted.

Upon reading Hegstad and Cregan, a skilled artisan would find no reasonable expectation of success in finding the Rps8 trait locus as claimed. This is because despite the Examiner’s assertions that Hegstad had “success” in producing a method for determining the presence of trait loci in soybean associated with some forms of soybean resistance to *P. sojae*, Hegstad was not successful in finding any soybean accessions that were resistant to *P. sojae* race 7, or that contained trait locus Rps8. The fact that Hegstad discloses the use of well known molecular

marker-based techniques to analyze soybean accessions with known resistance patterns and to find some soybeans with new *Rps* alleles or genes, non of which were the *Rps8* of the instant application, does not render the discovery of all future novel *Rps* genes obvious, just as the disclosure of PCR and other molecular biological techniques cannot, and does not, render obvious the discovery of new genes through the use of these techniques.

Since Hegstad, even if combined with Cregan, does not teach or suggest a soybean plant with resistance to *P. sojae* race 7, one would not have the expectation of finding soybeans resistant to these pathotypes. This is generally the case, because as Applicants noted in their response to the Office Action of March 3, 2006, skilled artisans cannot use molecular markers to screen soybean populations for the presence of novel *Rps* resistance genes unless they have a plant that carries the resistance gene. Such a plant is identified through inoculations with various *P. sojae* pathotypes. Therefore, although the use of molecular markers that are good predictors of the presence or absence of a trait is a well recognized industry method, discovery, mapping and “tagging” of the trait (i.e. discovering the gene and discovering which markers are associated with the gene) is a prerequisite of this type of marker assisted selection. (See Declaration of Anne Dorrance, August 25, 2006, stating that the first step in marker assisted selection is “identifying the locus/gene of interest, i.e. *Rps8*, which confers the desired trait, i.e. a new, *Rps8* derived resistance to *P. sojae* pathotypes that will normally kill plants, including plants that have one or more of the previously identified *Rps* genes” i.e., *Rps1a*, *Rps1b*, *Rps1c*, *Rps1d*, *Rps1k*, *Rps2*, *Rps3a*, *Rps3b*, *Rps3c*, *Rps4*, *Rps5*, *Rps6* or *Rps7*). Applicants are the first to discover and tag the novel the *Rps8* gene. Once the novel *Rps8* gene was discovered and tagged with molecular markers, those molecular markers can be used to determine the presence of *Rps8* in other plants. (See Diers Dec. for further clarification).

Since Hegstad, even when combined with Cregan, does not teach all the elements of claim 1, this claim is nonobvious over Hegstad and Cregan. Claims 2, 3, 25, and 26 depend from claim 1 and so are nonobvious for at least the same reasons as those for claim 1.

Amended claim 27 recites a first parent that has Rps8-derived *P. sojae* resistance.

Rps8-derived *P. sojae* resistance is defined in the specification as: “*P. sojae* resistance in a soy germplasm that is provided by the heterozygous or homozygous expression of the gene within the Rps8 locus mapped to MLG F.” (§0032). The specification further describes that plants expressing the Rps8 gene are resistant to particular *P. sojae* pathotypes. (see specification at 0067 and Table 1, showing resistance to *P. sojae* pathotypes OH30 (vir 1a, 1b, 1k, 2, 3a, 4, 5, 6, 7) and OH4 (vir 1a, 1c, 7); §0071 and Table 3, showing resistance to *P. sojae* pathotypes OH30 and OH4; §0076 describing resistance to OH1 (vir 7), OH17 (vir 1b, 1d, 3a, 3b, 3c, 4, 5, 6, 7), and OH25 (vir 1a, 1b, 1c, 1k, 7); §0079 and Table 5, showing resistance to *P. sojae* pathotypes OH1 (vir 7) and OH25 (vir 1a, 1b, 1c, 1k, 7)). Therefore, plants expressing the Rps8 gene are resistant to *P. sojae* pathotypes vir 1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7, and Rps8-derived resistance means resistance to all *P. sojae* pathotypes vir 1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7, in whatever combination. Since neither Hegstad nor Cregan teach or suggest such resistance (see above), Claim 27 is nonobvious over Hegstad and Cregan.

Claims 28-32 depend from claim 27 and so are nonobvious for at last the same reasons.

Claim 33 recites a method of identifying soybean plants wherein the method provides an indication that the trait locus Rps8 is present in the plant.

The specification makes clear that when trait locus Rps8 is present in a plant, the plant has resistance to *P. sojae* pathotypes vir 1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7. Since Hegstad or Cregan do not teach or suggest a soybean plant that has resistance to *P. sojae*

pathotypes vir1a, 1b, 1c, 1d, 1k, 2, 3a, 3b, 3c, 4, 5, 6 and 7, these references do not teach or suggest a plant in which trait locus Rps8 is present. Therefore, claim 33 is nonobvious over Hegstad and Cregan.

Claim 34 depends from claim 33 and so is nonobvious for at least the same reasons.

Claim 35 recites selecting a soybean plant having Rps8-derived *P. sojae* resistance.

Claim 36 depends from claim 35. Accordingly, these claims are also nonobvious.

In conclusion, claims 1-3 and 25-36 are nonobvious because neither Hegstad nor Cregan teach or suggest all the elements of these claims.

New Claims

New claims 37-41 have been added and are supported by the specification. New claims 37, 38 and 40 recite that the parent which has Rps8 derived resistance to *P. sojae* is a plant selected from various soybean varieties described in the specification, at for example, ¶ 0063-72.

Claim 39 recites the method of determining the Rps8-derived resistance of the first parent and is supported by the specification by the passages describing *P. sojae* inoculations, e.g., ¶0067, ¶0076, and tables 1, 3, 5 and 9.

Claim 41 recites trait locus Rps8. All of the elements of the claim are supported by the specification. Therefore new claims 37-41 do not add new matter.

It is respectfully submitted that the application is now in condition for allowance. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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By: /diane h. dobre/
Diane H. Dobrea
Reg. No. 48,578
(614) 621-7788